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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/851,465	05/05/1997	EDGAR C. ROBINSON	INT21246	5986

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EXAMINER

COCKS, JOSIAH C

ART UNIT	PAPER NUMBER
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3749

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 08/851,465	Applicant(s) ROBINSON ET AL.	
	Examiner Josiah Cocks	Art Unit 3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE filed 11/24/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/24/2006 has been entered.

Claim Objections

2. Claims 1-8 are objected to because of the following informalities:

In claim 1, 3rd to last line, the reference to "a burner tube" should read "said burner tube" as it is clear that applicant intends to refer back to the burner tube introduced in line 2 of the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. **Claims 1, 2, and 4-8** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,428,406 to Nutten et al. ("Nuttan") in view of U.S. Patent No. 3,245,458 to Patrick et al. ("Patrick") and U.S. Patent No. 4,061,463 to Bennett ("Bennett").

Nuttan discloses in Figures 1-32 a liquid fuel burner assembly in the same field of endeavor as applicant's invention and similar to that described in applicant's claims 1, 2, and 4-

8. **(Bolded text below references elements and sections from the prior art.)**

In particular, in regard to at least claim 1, Nutten shows a burner assembly comprising a burner tube **(cylindrically shaped member 16 that includes hollow sleeve/tube 18, see col. 4, lines 10-13)**, an air aspirated nozzle **(40)**, a compressor to provide air under positive pressure to the air aspirated nozzle **(see at least col. 4, lines 66-69 describing that air is compressed in pump chamber 22)**, a fuel supply tank **(54)** to supply liquid fuel in liquid form and at ambient pressure to the air aspirated nozzle **(see col. 4, lines 42-49)**, the fuel entering the nozzle under negative pressure created by air entering the air aspirated nozzle under positive pressure **(see at least col. 4, lines 50-56)**. Fuel and air being mixed within the air aspirated nozzle and being

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combusted substantially with the burner tube (18) immediately adjacent to and downstream from the air-aspirated nozzle (40) (see at least col. 4, lines 50-56).

In regard to the recitation of a metering valve, this limitation is considered met by at least the valve (160) of Nutten. The valve (160) is operated to control the flow of fuel to the burner nozzle (40). This valve may completely shut off the fuel flow but is also described as being operated in a "partially open position" (see col. 7, lines 36-40) and may "reduce or shut off" the flow of fuel (see col. 8, lines 56-61). This disclosure of the valve being "partially open" and operating to "reduce" fuel flow is considered to suggest a valve positioned as recited that functions to meter the fuel as recited in applicant's claim.

In regard to at least claims 2 and 4, the burner assembly of Nutten further includes a zero pressure regulator (see the diaphragms 94, 142, Fig. 5) contained with the control unit (60) that function to control fuel flow in the event of failure of the air flow, and pressure actuated arrangements for controlling flow of liquid fuel to the burner (see at least col. 2, lines 22-40 and col. 9, lines 14-34 describing the operation of the pressure responsive diaphragms in unit 60).

In regard to at least claim 5, note fuel supply is a fuel tank (54).

In regard to at least claim 6, the pump chamber/compressor (22) is operatively connected to the fuel tank (54) to create suction in the fuel tank (see col. 4, lines 46-41).

In regard to at least claim 7, at least valve (110) within control unit (60) has a first and second position such that in a first position vacuum from the compressor is applied to the fuel tank and in a second position the compressor is isolated from the fuel tank (see at least col. 7, line 41 through col. 8, line 5).

In regard to at least claim 8, manual valve (58) is provided to isolate the fuel tank and air aspirated nozzle such that in a first position fuel is allowed to pass to the nozzle and in a second position fuel is isolated from the nozzle (see col. 4, lines 42-44 and col. 7, lines 49-52).

Nutten does not disclose that the burner is an infrared burner that includes a burner tube that has a perforated outer surface.

However, Patrick is cited to remedy this deficiency. Patrick teaches a liquid fuel fired burner that is considered analogous art to both applicant's invention and Nutten. The liquid fuel burner of Patrick is expressly noted to be an infrared burner (see col. 1, lines 8-9). This infrared burner includes a burner tube that includes a burner tube that is perforated that is typical of infrared burner assemblies (see Fig. 7 showing a burner tube 510 that includes perforations 514 and 518e in outer surfaces 512 and 518).

Bennett is cited to provide clear motivation as to why one of ordinary skill in the art would be prompted to modify the burner assembly of Nutten to be arranged in the form of an infrared burner having a perforated burner tube. Bennett shows a liquid fuel burner that is considered analogous art to each of applicant's invention, Nutten, and Patrick. In Bennett it is expressly noted that infrared burners are a preferred category of burner because of their cleanliness and efficiency (see Bennett, col. 3, lines 15-17). Further, Bennett also clearly provides that liquid fuel burners (such as each of Nutten and Patrick) are understood to be more susceptible to flame quenching than gas fuel burners. Flame quenching producing undesirable soot that is detrimental to industrial finishes and other heating processes (see Bennett, col. 3,

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lines 18-23). Accordingly, liquid fuel burners are desirably formed as infrared burners to minimize the possibility of flame quenching since combustion in these types of burners occurs against an incandescent surface of the burner (such as the perforated burner tube of Patrick), which is generally at a temperature of 1600 to 2500 degrees Fahrenheit and is above the quenching temperatures (see **Bennett, col. 3, lines 23-27**).

Therefore, in regard to claim 1, 2, and 4-8, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the burner tube of Nutten to be formed as a perforated burner tube, thus allowing Nutten to operate as an infrared burner, as shown in Patrick as infrared fuel burners are recognized for their cleanliness and efficiency (see **Bennett, col. 3, lines 15-17**), and in the case of liquid fuel burners, operation of a burner as an infrared burner to minimize the possibility of flame quenching since combustion in these types of burners occurs against an incandescent surface of the burner, which is generally at a temperature of 1600 to 2500 degrees Fahrenheit and is above the quenching temperatures (see **Bennett, col. 3, lines 23-27**).

6. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nutten in view of Patrick and Bennett as applied to claim 2 above, and further in view of U.S. Patent No. 3,361,183 to Reichhelm ("Reichhelm").

Nutten in view of Patrick and Bennett suggest substantially all the limitations of claim 3 (note discussion above) with the possible exception that the fuel metering valve is specifically a manually adjustable valve.

Reichhelm teaches a liquid fuel burner in the same field of endeavor as both applicant's invention and Nutten. In Reichhelm, the burner includes a liquid fuel control **(22)** valve that is interposed within the liquid fuel line **(see col. 4, lines 60-62)** to desirably allow metering of the fuel flow during operation of the burner to contribute to the production of desired flame settings **(see col. 6, lines 1-4)** and to achieve desired characteristics of burner performance **(see col. 5, lines 54-57)**. As shown particularly in Fig. 2, valve **(22)** includes a handle that is rotated in order to allow the metering of the fuel. Accordingly, this valve is considered a metering valve that is manually adjustable as recited in applicant's claim 3.

Therefore, in regard to claim 3, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the fuel control valve (at least 160) of Nutten to incorporate manual adjustability as taught Reichhelm as such manual operation is clearly recognized in the art for the desirable purpose of controlling air and fuel ratio during operation of the burner to contribute to the production of desired flame settings **(see Reichelm, col. 6, lines 1-4)** and to achieve desired characteristics of burner performance **(see Reichelm, col. 5, lines 54-57)**.

Response to Arguments

7. Applicant's arguments filed 11/24/2006 have been fully considered but they are not persuasive.

Applicant argues that the prior art does not recognize the use of an infrared burner in where pre-mixing does not occur. The examiner does not agree.

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In response, the examiner notes that while Bennett does indicate that infrared burners are generally regarded as being of the pre-mix type (Bennett, col. 1, lines 22-24), this is not regarded as an assertion that infrared burners cannot also function where the fuel and air are mixed at the burner rather than before. To support this conclusion, the examiner notes that Bennett makes clear that the benefit provided by an infrared type burner is in the combustion that occurs “against an incandescent surface” enabling temperatures well above quenching temperatures (see Bennet, col. 3, lines 24-27). A person of ordinary skill in the art would reasonably recognize that combustion against the incandescent surface would be capable (and desirable) regardless of whether the combustion feeds (i.e. fuel and air) are pre-mixed or mixed at the burner. Support for this assertion is found in the reference to Patrick. As noted above, Patrick clearly shows an infrared burner that includes a burner tube with a perforated outer surface. This burner operates by mixing in the vicinity of a burner a flow of fuel from a fuel nozzle (504) with a flow of compressed air provided by blower (612). The combustible mixture is ignited and combusts against an incandescent surface that is in the form of a perforated outer tube in the same manner as disclosed by applicant. Again, as is made clear in Bennett, this combustion against an incandescent surface is desirably in liquid fuel burners. Accordingly, a person of ordinary skill in the art would reasonably seek to modify the liquid fuel burner of Nutten to include an incandescent combustion surface in the form of a perforated burner tube as taught in Patrick to obtain the recognized benefits described in Bennett.

Therefore, applicant’s claims are not considered to patentably distinguish applicant’s invention over the prior art of record.

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Conclusion


8. This action is made non-final. A THREE (3) MONTH shortened statutory period for reply has been set. Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Josiah Cocks whose telephone number is (571) 272-4874. The examiner can normally be reached on M-F 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Rinehart can be reached on (571) 272-4828. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

jcc
February 19, 2007


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PRIMARY EXAMINER
ART UNIT 3749